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published in

Gedrag en Gezondheid
1999

document version

Publisher's PDF, also known as Version of record

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citation for published version (APA)

van Tilburg, T. G. (1999). Changes over time in the personal networks and health of older adults. *Gedrag en Gezondheid*, 27, 61-66.

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Changes over time in the personal networks and health of older adults

Theo van Tilburg*

Summary

Changes in the networks and the health of a general sample of 2,903 Dutch older adults were studied, based on three observations with a total time span of four years. The better the functional capacity and the self-rated health of the old people, the larger their network was, the less instrumental support was received from their network members, and the more instrumental support was given. The positive effect of poor health on instrumental support received can be considered an effect of the mobilization of helpers. The negative effect of poor health on instrumental support given, reflects the fact that people in poor health have difficulty in actively maintaining their relationships. Both tendencies affect the network size in different directions, which might be a reason for the relatively small effect of health on the network size.

Introduction

There are older adults with very small personal networks, but nearly all studies have shown that most have a significant number of relationships (Broese van Groenou & Van Tilburg, 1996). Furthermore, old people in general are no more vulnerable to losses in their network than young people (Berkman, Oxman & Seeman, 1992). However, the question whether the ageing of old people results in losses in their network remains open for discussion. Decline in health and loss of functions associated with advanced age (known as the deficit model) have been the primary focus of gerontology (Baltes & Carstensen, 1996).

The limitation of health resources may reduce the possibilities for maintaining relationships, resulting in the loss of network members (Morgan, 1988). A second reason for the deterioration of relationships may be that people in poor health are in need of support, but are restricted in reciprocating this support (Dowd, 1984). When support received is not returned, the balance of receiving

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and giving support within the relationship will be affected. It is less likely that the receipt of support will continue, and in the long run it is to be expected that the relationship will end, despite the fact that the relationships of people who are ill are less affected by the norm of balance than other relationships (Gouldner, 1960).

However, losses may coincide with gains. Poor health increases demands, particularly for instrumental support (Brody, 1985). These increased demands may result in the mobilisation of helpers, and thus increase the support received (Broese van Groenou & Van Tilburg, 1997). Due to this mobilisation effect when illness is involved, there may also be positive effects of a decline in health on the size of the network and the instrumental support received.

In the present study, an analysis was made of the changes in the networks and the health of a general sample of Dutch older adults, based on three observations with a total time span of four years. Three characteristics of the network were studied: the network size, and the instrumental support received and given. Health was specified as functional capacity, self-rated health and health-related limitations in functioning. Negative effects of poor health on network size and instrumental support given were expected to be observed. Furthermore, due to the mobilisation effect, a positive effect of poor health on the instrumental support received was also anticipated.

Method

Respondents

In 1992 (T1), 3,805 respondents were interviewed (Knipscheer, De Jong Gierveld, Van Tilburg & Dykstra, 1995). They were part of a stratified random sample of men and women born between 1908 and 1937. The oldest individuals, and in particular the oldest men, were over-represented in the sample. The sample was taken from the population registers of eleven municipalities: the city of Amsterdam and two rural communities in the western region of the Netherlands, and two cities and six rural communities in the south and east. These regions were considered to represent the current differences in culture, religion, urbanization and ageing in the Netherlands. During 1992-1993 (T2), a follow-up was carried out among 3,107 respondents (Deeg, Beekman, Kriegsman & Westendorp-De Serière, 1998). The interval between T1 and T2 averaged .86 years ($SD = .18$). At T3, in 1995-1996, 2,302 respondents were interviewed. The interval between T1 and T3 averaged 3.92 years ($SD = .21$; with a minimum of 3.16 and a maximum of 4.74 years). Longitudinal data on the networks were available for 2,903 respondents (only two observations were available for 807 respondents). The main reason not to delineate networks for all the interviews was that an abridged version of the questionnaire was conducted with the respondents in a specific wave who were too physically or cognitively frail to be interviewed using the full questionnaire. Details on the sample and the non-response were reported in Van Tilburg (1998).

Measurements

Network members were identified with whom the respondent had a regular and important contact. For instrumental support exchanges, two questions were asked about the relationships with a maximum of ten members, who were selected on the basis of the highest contact frequency with the respondent. One question was asked pertaining to support received: 'How often in the past year did X help you with daily chores in and around the house, such as preparing

meals, cleaning, transportation, minor repairs, filling out forms?' For support given, the question was reversed. The answer categories were never, seldom, sometimes and often, with values ranging from 0 to 3.

To assess health status, three instruments were used. The first one consisted of six questions about having difficulty in performing the activities of daily living (functional capacity). The items constituted scales at the three observations (Loevingers Homogeneity $\geq .59$; Cronbachs' $\alpha \geq .83$), which ranged from 6 (no problems) to 30 (numerous problems). The second instrument pertained self-rated health: 'How is your health in general?' Answers ranged from 1 (excellent) to 5 (poor). For health-related limitations in functioning, it was asked: 'Are you limited in your daily activities due to chronic diseases, health disorders or handicaps?' Answers ranged from 1 (no limitations) to 3 (severe limitations).

Procedure

To study the association between health and the network, multilevel regression analysis was applied (ML3; Prosser, Rasbash & Goldstein, 1991). Two or three observations were nested in the respondents. Time was entered into the equation, followed by the time-specific measurements of partner status and of living independently versus being institutionolised (as control variables) and health. In explaining the change in instrumental support exchanges, the network size was also entered into the equation. All explanatory time-specific measurements were computed as the difference between actual score and initial level. It was thus possible to extend the regression equations with variables for the initial level. The effects of these variables indicate the effects across time, and are constant over time.

Results

Changes in health

At T1, according to the three indicators of health, most of the respondents were in good health. For functional capacity, the average was 7.9 (SD = 3.5), for self-rated health, the average score was 2.3 (SD = .9), and for health-related limitations, the average was 1.4 (SD = .7). Although improvement in health status was observed in a few respondents, in general for all three measurement instruments a decrease was assessed between T1 and T3. For functional capacity, the average scores increased from 7.5 (SD = 3.0) at T1 to 8.9 at T3 (SD = 4.7; $t(2139) = 18.8$, $p < .001$). For self-rated health, the increase was from 2.2 (SD = .8) to 2.4 (SD = 2.9; $t(2139) = 8.2$, $p < .001$), and for health-related limitations, the increase was from 1.4 (SD = .7) to 1.6 (SD = .9; $t(2139) = 12.1$, $p < .001$).

Changes in network size and instrumental support received and given

On average, a large number of network members were identified at all three observations. For the respondents for whom three observations were available, the average network size at T1 was 15.1 (SD = 10.0), at T2 14.3 (SD = 8.3) and at T3 14.5 (SD = 8.7). Multivariate analysis of variance for repeated measurements showed that the decrease from T1 to T2 was significant ($F(1,2095) = 20.4$, $p < .001$), but that the difference between T1 and T2, on the one hand, and T3 on the other hand, was not significant ($F(1,2095) = .6$).

On average, low levels of exchanges of instrumental support characterised the relationships of respondents. The averages for support received and given at T1 were .69 (SD = .70) and .69 (SD = .72), respectively. The network size correlated .02 and .08 with the averaged instrumental support received and given, res-

Table 1 *Multilevel regression of network characteristics*

	Network Size		Support Received		Support Given	
	β	t	β	t	β	t
<i>Change over time</i>						
Time	.01	.7	.06	6.1***	.03	3.3***
Functional capacity (increase-decrease)	-.02	-2.3*	.05	4.8***	-.05	-4.9***
Self-rated health (increase-decrease)	-.02	-1.8	.05	4.2***	-.01	-1.3
Health-related limitations (increase-decrease)	.00	.2	.02	1.4	-.02	-1.6
Network size (decrease-increase)			.02	2.1*	.02	1.8
Partner (lost, no change, gained)	.01	.7	-.06	-6.0***	.01	1.5
Institutionalized vs. unchanged	.02	2.3*	-.01	-.7	.02	2.0*
<i>T1 measurements</i>						
Functional capacity (no-numerous problems)	-.05	-2.4*	.09	5.3***	-.15	-8.1***
Self-rated health (excellent-poor)	-.08	-4.5***	.04	2.2*	-.06	-3.6***
Health-related limitations (no-severe)	.02	.7	.03	1.6	.02	.9
Network size (small-large)			.07	4.4***	.09	5.6***
No partner vs. partner present	.15	9.3***	-.07	-4.9***	.14	9.7***
Institutionalized vs. living independently	.03	2.1*	.02	1.3	.01	1.1

* $p < .05$; ** $p < .01$; *** $p < .001$

pectively, and the correlation between support given and received was .32. Instrumental support received increased over time. The averages were .79 (SD = .71) and .86 (SD = .72) for T2 and T3, respectively. Both of these increases from one observation to another were significant ($F(1,2080) = 32.2, p < .001$, and $F(1,2080) = 54.7, p < .001$, respectively). For instrumental support given, the averages were .73 (SD = .73) and .70 (SD = .73) for T2 and T3, respectively. Only the change from T1 to T2 was significant ($F(1,2079) = 6.6, p < .01$; for the difference between T1 and T2, on the one hand, and T3 on the other hand: $F(1,2079) = .3$).

The association between changes in health and changes in the networks

In explaining the course of developments in network size (Table 1), time had no effect. When the functional capacity increased or decreased between two observations, the network size changed in the same direction. Self-rated health, health-related limitations and change in the presence of a partner had no effect. Older adults who became institutionalised, lost network members. Concerning the initial scores, respondents with good functional capacity and self-rated health had larger networks across the observations. Respondents who had a partner and who lived independently had larger networks across the observations. The explained variance was 6.7% at respondent level and 9.5% at observation level.

Instrumental support received increased significantly over time. Respondents received more help when their functional capacity and self-rated health decreased. When the network size increased between two observations, more support was received across the relationships. This may indicate that when new members entered the network, they gave more support than the members who were included in the network at an earlier observation. When functional capacity and self-rated health were initially poor, more support was received across the observations. A larger network at T1 resulted in more support received across the observations, probably because the ten relationships on which support data were collected were the most supportive relationships selected from the larger pool of potential supporters within the network. The presence of a partner resulted in less support received across the observations, probably because when there is a partner there is less need for support from others. The explained variance was 5.8% at respondent level and 5.1% at observation level.

Respondents appeared to give more instrumental support over time. When the functional capacity between two observations decreased, or if the respondent became institutionolised, less support was given to the network members. When a respondent initially had a better functional capacity, a better self-rated health, a larger network or a partner, more support was given across the observations. The explained variance was 13.4% at respondent level and 9.7% at observation level.

Discussion

The better the health of the old people, the larger their network was, the less instrumental support was received from their network members other than the partner, and the more support was given. In accordance with the observations made by Schwarzer and Leppin (1991), the positive effect of poor health on instrumental support received can be considered as an effect of the mobilisation of helpers. The negative effect of poor health on instrumental support given, reflects the fact that people in poor health have difficulty in actively maintaining their relationships. Both tendencies affect the network size in different directions, which might be a reason for the relatively small effect of health on the network size.

For both instrumental support received and given, an explanation for the small effects of health might be the large variation in the exchanges of support among respondents who were in good health. Although many respondents had chronic diseases, on average they reported good health at the first observation, and the decrease in health after the initial observation was small. Furthermore, those in good health might have received more support in return for the support given, although no evidence was found for this indirect relationship. However, if this reciprocation takes place, the negative relationship between health and support received would be less strong. With regard to support received, in particular, it takes time to mobilise helpers, and this could cause a delay in the effect of decreasing health on increased help. Furthermore, no investigation was made of the amount of assistance received from formal or privately financed sources. This type of assistance might have replaced support received within the network. The need for support from other network members might have been limited, in particular since many of the respondents lived with a partner. Finally, many older adults do not want to be dependent on their network. Since the ability of older adults in poor health to reciprocate the support received may be limited, the amount of instrumental support they are wil-

ling to accept from their network might be less than they may need.

In this study, only the effects of health on the network were analysed. However, the reverse effects also need to be studied: network characteristics may affect a person's health (Cohen, 1988). In a future study, the mutual dependency of the network and health will be investigated.

Acknowledgements

This study is based on data collected in the context of the 'Living arrangements and social networks of older adults' and the 'Longitudinal Aging Study Amsterdam' research programs, which are being conducted at the Vrije Universiteit Amsterdam and the Netherlands Interdisciplinary Demographic Institute, and are supported by the Netherlands Program for Research on Ageing (NESTOR) and the Dutch Ministry of Health, Welfare and Sports.

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